

MAMMOMAT 3000 Modular

SP

Service

Repair Instructions

Replacing the filter assembly

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Tools and expendables required

- Standard assembly tools
- Circlip pliers
- Denatured ethanol, 99.5% pure (may only be denatured with toluene, which does not leave any residues when evaporated) for cleaning the filters or tube window.
- Lint-free cloth or Q-tips (cotton tops) for cleaning
- Lint-free cotton gloves

Parts required

- Filter-assembly kit, part no. 63 43 805 X041E. This kit contains filter disk with two filters only, used with MAMMOMAT 3000 with Mo X-ray tube.

Documents required

Installation and Start-Up Instructions for MAMMOMAT 3000

Time required

Approximately two hours for one person.

Important notes

- The Allen screws can be very hard to loosen. When unscrewing, be sure of enough grip with the Allen screw-driver, so that the screws do not get damaged.
- The filters in the filter assembly must not be contaminated in any way. Therefore, always use lint-free cotton gloves during the handling of the filter assembly. Do not remove the filter assembly from its packing until installation.
- If the filters have been contaminated, clean by using the specified alcohol. Other types of solvents may leave residues.

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Registration of X-ray field

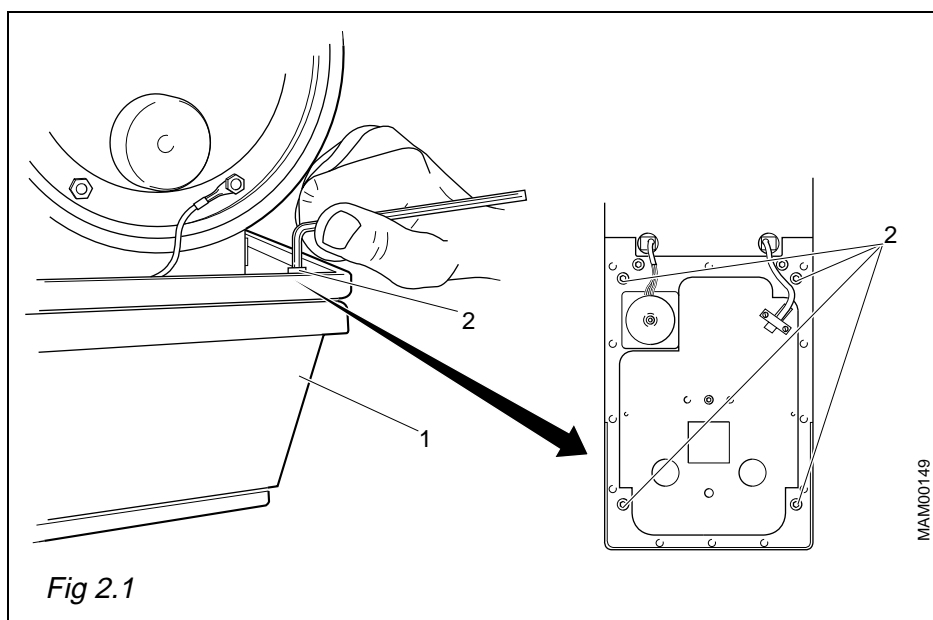
NOTICE

It is very important that this registration will be done before starting the disassembly.

1. System ON.
2. Proceed according to "Checking the radiation field limitation" in the Installation and Start-Up Instructions for MAMMOMAT 3000 Modular.
3. Save the films as reference films.
4. System OFF.

Disassembly

Removal of collimator cover

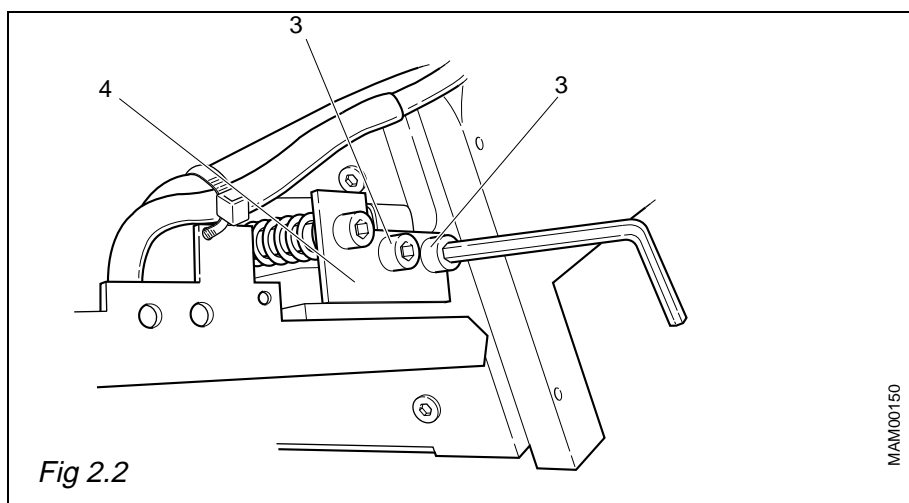


1. Remove the swivel-arm covers.
2. Remove the collimator cover (1) by unscrewing four Allen screws (2).

NOTICE

Do not remove any other Allen screws than shown in figure 2.1.

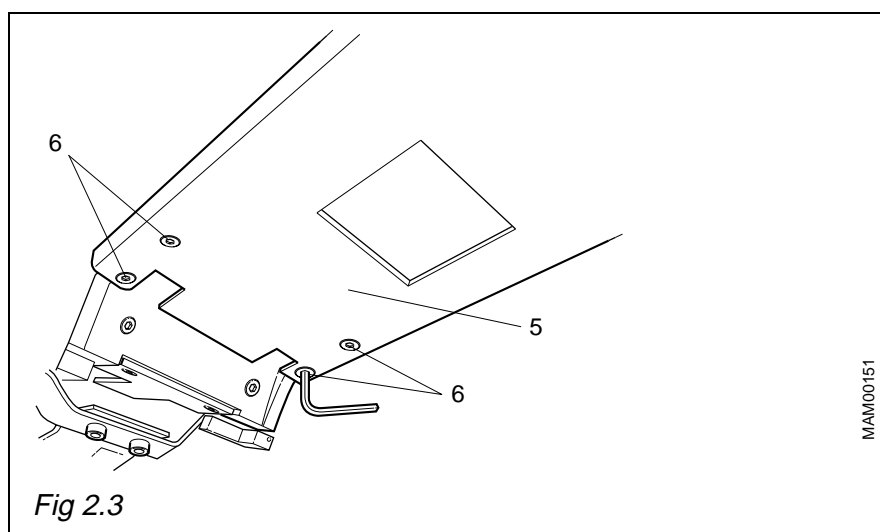
3. Strap the collimator cover to the stand.

Removal of lamp holder

1. Remove the lamp holder (4) by unscrewing the two Allen screws (3).

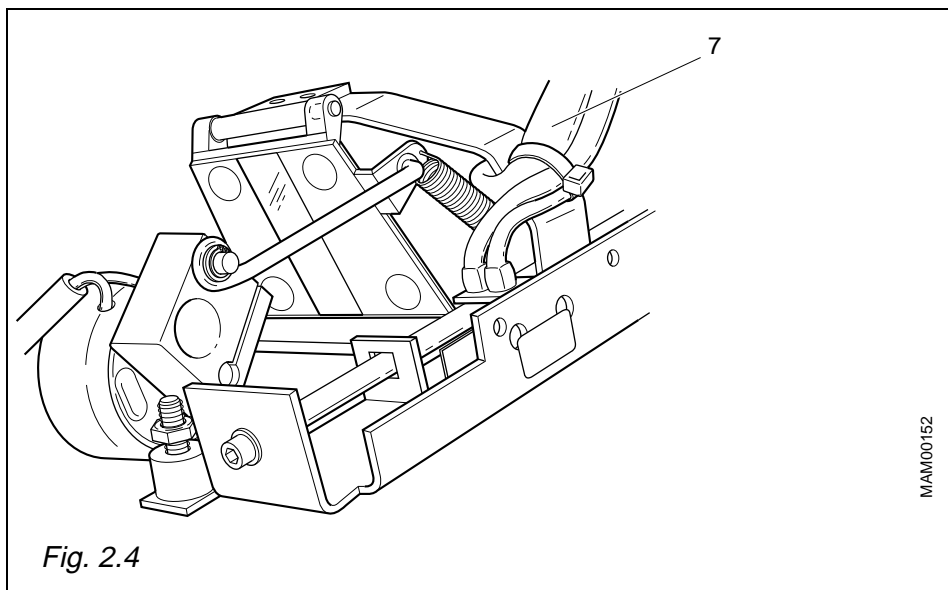
NOTICE**Be careful with the filter assembly.**

2. Lift the holder (4) and carefully push it inside the collimator.

Removal of diaphragm-plate assembly

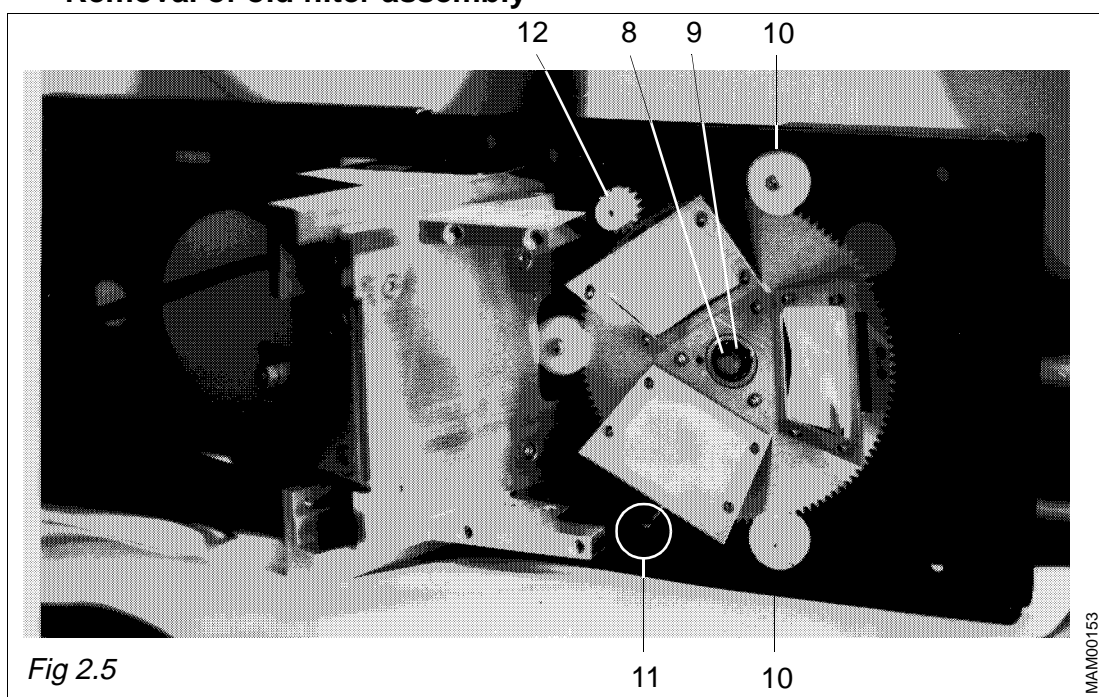
1. Loosen the diaphragm-plate assembly (5) by unscrewing four Allen screws (6).

2. To release the diaphragm-plate assembly, cut the cable ties on each side of the tube head.



3. Lower the diaphragm-plate assembly and let it hang in the cables (7).

Removal of old filter assembly



1. Remove retaining ring (8) and bearing (9).
2. Remove the two front guides (10). The rear guide need not be removed.
3. Remove the filter assembly.

NOTICE

Be careful not to damage the optical switch position sensor (11) during the removal.

Installation

Installing the new filter assembly

See figure 2.5 and 2.6.

1. Position the new filter assembly so that the cog disc engages with the motor pinion (12) and the rear guide. The angular position of the filter assembly in relation to the motor pinion is arbitrary.
2. Install the two front guides (10).
3. Install the bearing (9) and secure with the retaining ring (8).

NOTICE

Do not touch the filters with bare fingers. Use lint-free cotton gloves. Be careful not to damage the optical switch position sensor (11) during the installation.

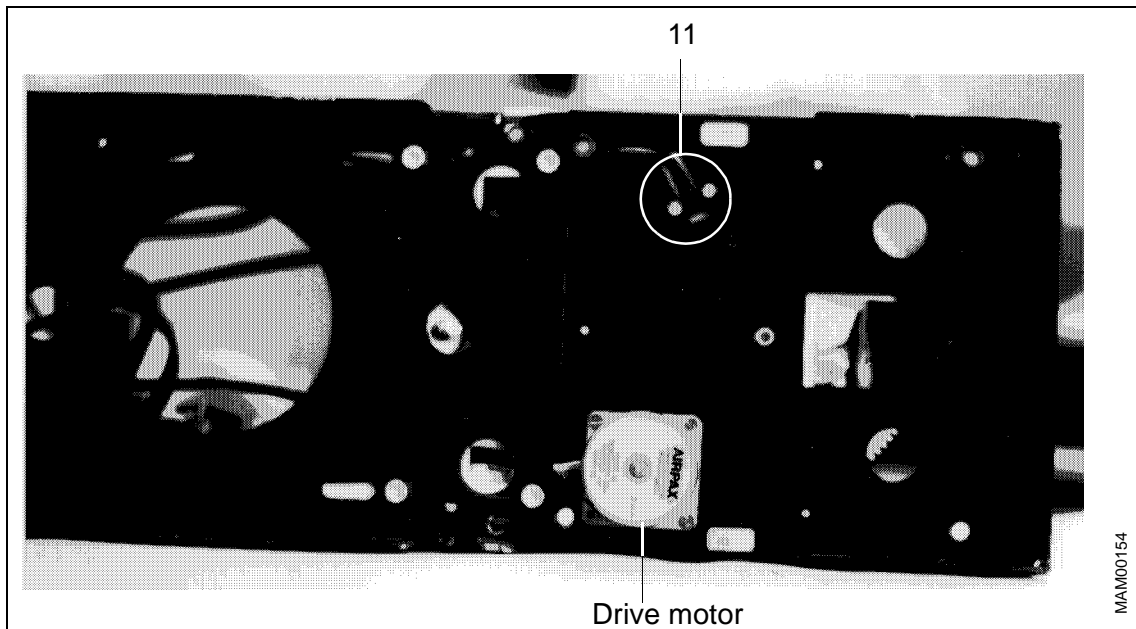


Fig. 2.6 Position sensor and drive motor of the filter assembly

Reinstalling the diaphragm-plate assembly

See figure 2.2 and 2.3.

NOTICE

Be careful with the filter assembly.

1. Fit the diaphragm-plate assembly to the diaphragm-plate holder, while carefully putting the lamp holder into position, and fasten with the four Allen screws (6).
2. Fit the lamp holder (4) to the diaphragm-plate holder and fasten with the two Allen screws (3).
3. Secure the cables, one on each side, with cable ties.

Checking the X-ray field

1. System ON.
2. Proceed according to "Checking the radiation field limitation" in the Installation and Start-Up Instructions for MAMMOMAT 3000 Modular. Use the same cassette and object table as for the reference films. Compare the films with the reference films. Should they deviate from the reference films, this might be due to the diaphragm-plate assembly (5/Fig 2.3) not being properly fitted when reinstalled. This can be put right by just loosening the four countersunk screws (6/Fig 2.3) and then tightening them again.
3. Make new exposures and compare with the reference films.
4. System OFF.

Final procedures

See Fig 2.1

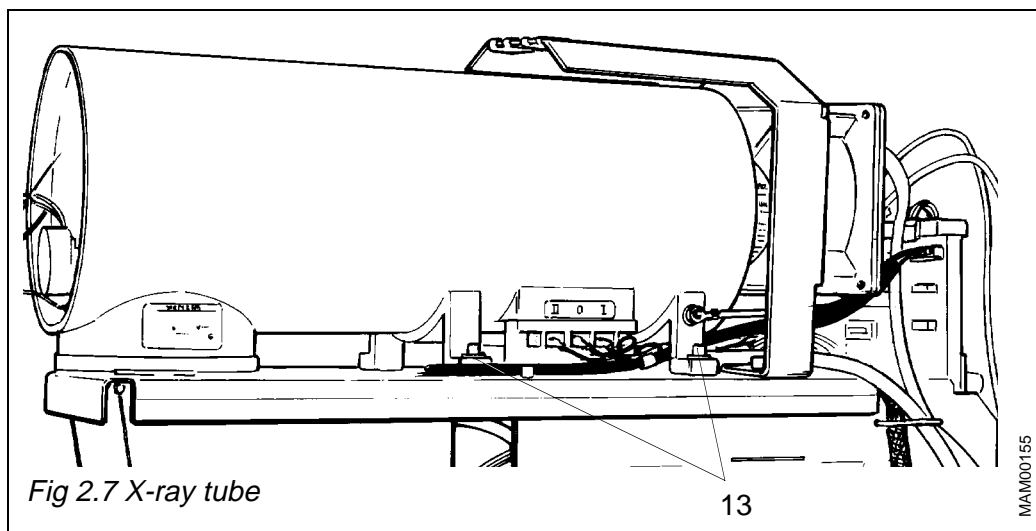
1. Mount the magnification table. Check that there is sufficient space between the cables and the rotating filter assembly.
2. Select different anode/filter combinations on the control panel. During the operation of the filter-assembly motor, check that the filter assembly rotates smoothly without any tendency of jamming. Should this not be the case, this is probably caused by too tight a fit between the cog disc and the motor pinion. This can be adjusted by following the instructions "Adjusting the position of the filter-assembly motor" below.
3. System OFF.
4. Fit the collimator cover (1) and fasten with the four Allen screws (2).
5. Reinstall the swivel-arm covers.

Adjusting the position of the filter-assembly motor

NOTICE

Only to be performed if the result of the functional check according to point 2 under "Final procedures" is proved unsatisfactory.

See Fig 2.7 and 2.8



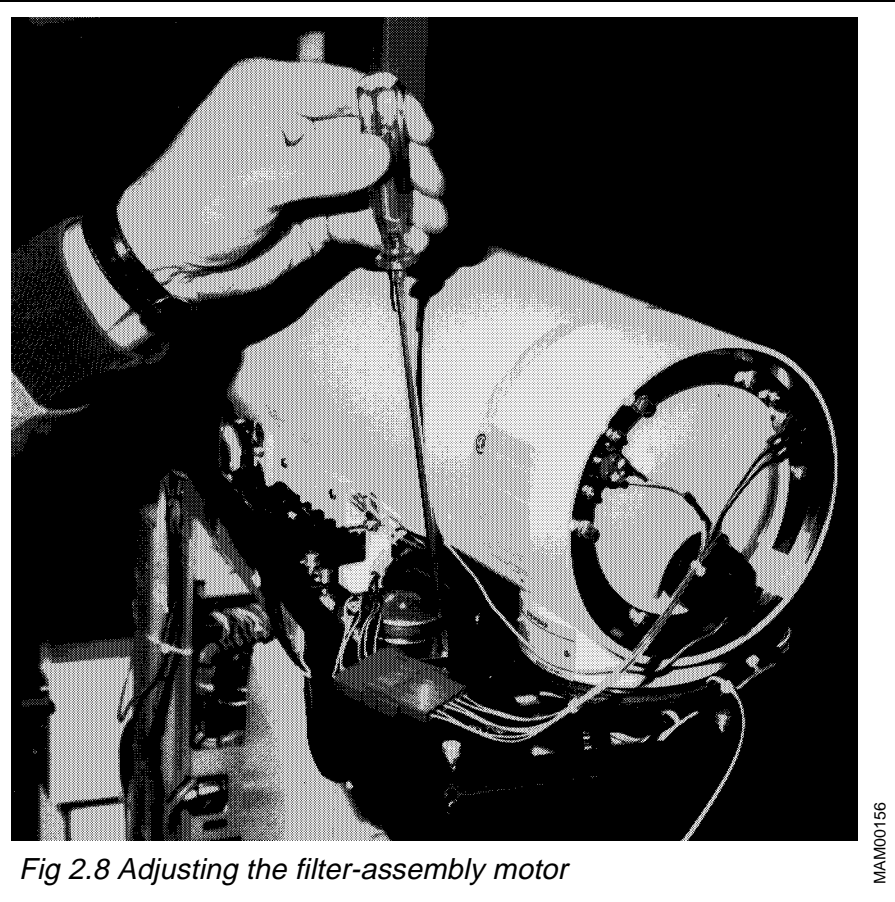
1. Cut the cable ties at the two rear mounting screws for the X-ray tube.
2. Remove the four mounting screws (13) to loosen the X-ray tube (see fig 2.7).
3. Lift the X-ray tube at the front to access the filter-assembly motor.

NOTICE

Do not disconnect any cables.

4. Loosen the screws for the filter-assembly motor, but do not remove them. Adjust the position of the motor so that the filter assembly can rotate freely without jamming.
5. Tighten the screws for the motor.

6. Reposition the X-ray tube paying attention to the guide pin.



7. Tighten the four mounting screws of the X-ray tube.
8. Provide new cable ties at the rear mounting screws of the X-ray tube.
9. System ON.
10. Check the operation of the filter-assembly motor by selecting different anode/filter combinations on the control panel.

Filter purity verification

The test procedure is dependent on the options available at the site.

For best verification, first use magnification table and then 24 x 30 object table. The magnification table activates the small focus, which will reproduce possible impurities on a larger scale. The 24 x 30 table is used to check the full area of the exposed film. If any of these two options is not available, use only the one available. If none of these two options is available, use 18 x 24 object table.

For each type of filter, perform the following test:

1. Mount the magnification table.
2. Insert a loaded film cassette in the table.
3. Select the filter to be checked.

4. Select kV and mAs (the exposure setting depends on the film/screen combination used). Make an exposure.
5. Develop the film.
6. Place the film on a film viewing device. The film shall have an even grey exposure. If not, make a new exposure with a different exposure setting.
7. If there are any visible particles or differences in homogeneity, proceed according to "Evaluation of discrepancies on test films" below, until the discrepancy is removed.
8. Repeat steps 2 - 7 using a 24 cm x 30 cm (or 18 cm x 24 cm) object table.

Evaluation of discrepancies on test films

1.
 - a) Expose a film with a different filter.
 - b) Expose a film with another cassette.
 - c) Expose a film with the cassette placed on top of the table.

NOTICE

Be aware of when performing 1c with magnification table, the magnification factor will be affected. This must be taken into consideration when comparing the test film with the original film.

2. Compare the original film with the test films exposed in 1a - c.
If there are no discrepancies on the film exposed according to **1a**, the problem lies in the filter. The previously used filter must then be cleaned with cotton tops and ethanol.
If no discrepancies appear in **1b**, the problem lies in the cassette.
If no discrepancies appear in **1c**, the problem lies in the object table.
3. If discrepancies still appear in the same area, when comparing the original film with the test films from 1a - c, the X-ray tube window must be examined for dirt and, if necessary, be cleaned. Should the discrepancies still remain, the fault is in the X-ray tube.